THE

YOUNG MECHANIC.

APRIL, 1833.

CHEMISTRY.

[Continued from page 40.]

OXYGEN.

Dephlogisticated air, vital air, fire air, pure air, &c.

Oxygen was first discovered by Dr. Priestly in 1774; by heating red precipitate in a glass retort connected with a hydro-pneumatic apparatus. The merit of its discovery is also due to Scheele and Lavoisier, both of whom obtained it, a short time after, by different means, and before they were informed of Priestly's experiments.

It is transparent, colorless, inodorous, a non-conductor of electricity. It refracts light less powerfully than any other gas. It retains under pressure, its gaseous state. By sudden condensation, it becomes luminous and hot. Its specific gravity, air being 1, is 1·1111. 100 cubic inches at 60° F. Bar. 30 weigh 33·9 gr. Its combining weight is represented by 8.; hydrogen being considered as unity. Water at 60° F. absorbs about 1-27 of its bulk of this gas. It combines with all simple bodies. It is not affected by light. Caloric has no other effect upon it than that of expansion. It goes to the positive pole in the electro-galvanic circuit, and is therefore considered as electro-negative.

Oxygen is universally diffused throughout nature, but is no where to be found except in combination with other substances. The means of obtaining it are numerous. The following are those most generally adopted, viz :

1. By heating nitrate of potassa (saltpetre) in an iron retort or

gun barrel, at a temperature a little below redness. From one pound treated in this manner, about 1600 cubic inches oxygen gas will be obtained. The last portion of gas which is obtained, should be kept separate from the other, it being impure. The first portion which is separated is nearly pure.

RATIONALE.—Nitrate of potassa consists of nitric acid and potassa. Nitric acid consists of oxygen and nitrogen. When the salt is heated, a portion of oxygen is separated from the acid, and there remains a compound of nitrous acid and potassa in the retort.

2. One hundred grains of chlorate of potassa, heated in a glass retort, afford about one hundred cubic inches of gas. If it be collected over mercury, it will contain nothing but aqueous vapor, from which it may be freed by introducing a few lumps of caustic potassa.

RATIONALE.—Chlorate of potassa consists of chloric acid (formed of chlorine and oxygen) and potassa, (formed of potassium and oxygen.) When the salt is heated, all the oxygen is separated, and chloruret of potassium remains.

3. Sulphuric acid, one part, mixed with two parts powdered black oxide of manganese, in a glass retort, and heated moderately, affords oxygen gas, containing only about 1-40 or 1-50 of adulteration.

By this process a portion of the oxygen is separated from the manganese, and sulphate of protoxide of manganese remains.

4. Black oxide of manganese, heated to redness in a retort, parts with a portion of its oxygen. This is perhaps the cheapest and most convenient method of procuring it when a considerable quantity is wanted. Oxide of manganese frequently contains carbonate of lime ; it should therefore before using, be washed with water acidulated with about 1-16th of nitric acid ; otherwise the oxygen would be contaminated with carbonic acid gas. One pound of good oxide of manganese will yield about 1200 cubic inches of oxygen gas. A very convenient and cheap retort may be formed, for obtaining oxygen by this process, by inserting a bent gun barrel into the top of an iron quicksilver jar.

When oxygen has been collected over water, it is usually contaminated with air which it separates from the water. To obviate this, mercury, or water which has recently been boiled, may be used. The degree of purity may be easily ascertained by introducing a determinate quantity into a curved tube, closed at one end and filled with mercury, so as to occupy the curved part, and about one-quarter of the whole tube. Next introduce half a grain of phosphorus to each cubic inch of gas. Close the end of the tube with the finger, under mercury, and apply heat, with a spirit lamp, to the curved part of the tube, as long as any light is perceived. The phosphorus combines with the oxygen, and the finger being removed, and the tube cool, the mercury rises to take its

place. We have only to measure the gas which remains to learn the quantity of adulteration.

Oxygen is the principal supporter of combustion and animal life. A body while burning introduced into it, burns with much more intensity. A taper, the flame of which having been extinguished, the wick only remaining lighted, if placed in a jar of oxygen, will be instantly rekindled, and this may be repeated with a quart of oxygen thirty or forty times. If a watch-spring be used instead of the taper, one end of which being heated to redness, a brilliant and rapid combustion ensues.

Animals confined in oxygen live five times as long as they would if confined in the same bulk of common air. When respired into the human lungs, it generally produces a slight exhilaration, and an agreeable warmth in the region of the chest. It has been introduced into medical practice, but a considerable diversity of opinion seems to exist in relation to its value in cases of disease. There are however many cases on record of its having been resorted to with success in cases of drowning, and injuries to the lungs resulting from inhaling noxious gases. Chaptal gives an instance of a man in the last stages of consumption who respired oxygen gas. His strength increased rapidly ; and in six weeks he was able to take long walks. His improved state of health lasted for six months, when he relapsed, and, unable to obtain more oxygen, he died.*

GEOMETRY AND ARITHMETIC.

[Continued from page 44.]

ANGLES AND DEGREES.

Definitions.—A line is called straight, when every part of it lies in the same direction.

When two straight lines have the same direction, they are said to be parallel to each other.

When two straight lines have different directions, they are either converging or diverging. Two lines are said to be converging if when extended they grow nearer each other, and diverging, if the reverse takes place.

When two straight lines meet, they form an angle ; the point at which they meet is called the vertex, and the lines themselves are called the sides of the angle. When a straight line meets another, so as to make the two adjacent angles equal, the angles are called right angles, and the lines are said to be perpendicular to each other. When two lines are neither parallel nor

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* Some interesting articles in relation to this subject, will be found in the American Journal, Vols. I and XVI, also in Tilloch's Philos. Mag.

perpendicular to each other, they are said to be oblique to each other.

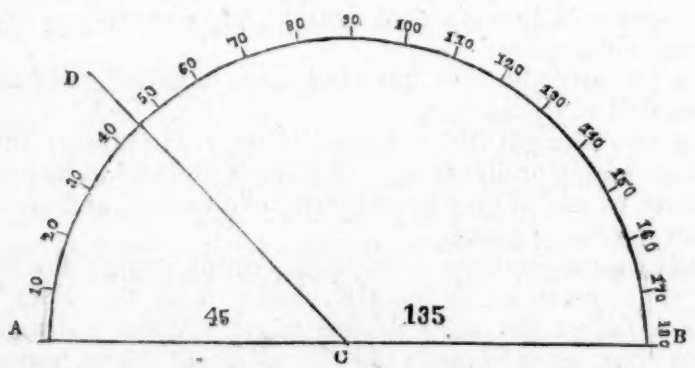
Any angle smaller than a right angle, is called acute, and when greater than a right angle, it is called obtuse. The three kinds of angles are represented in the following diagrams.

ANGLES.

Acute. Right. Obtuse.

The magnitude of an angle depends upon the degree of inclination, and not at all upon the distance or length of the lines. The nearer two lines are to being parallel, the smaller the angle, which becomes nothing when the lines become parallel. It increases as the lines diverge, until they form one straight line, when it ceases to be an angle. In measuring angles, a different plan has been adopted from that practised for lines, surfaces, and solids. These are measured by comparing each with a known quantity of its own kind as a standard, (see page 42.) But in measuring angles, the circle is used, which is a surface terminated on all sides by a curve line, returning into itself, all points of which are at an equal distance from a point called the centre of the circle. The curved line itself is called the circumference, and any part of it is called an arc. To measure an angle, then, is to find what portion of a circular arc is embraced by the two sides of the angle, the vertex of the angle being at the centre of the circle.

To obtain a clear idea of the magnitude of an angle, and the connection it has with a circular arc, let us suppose (in the annexed

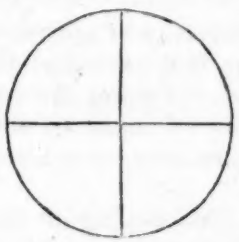


figure,) that at first the two lines D C and A B coincide in the part A C, and that the part D of the line D C be raised, so that this line, departing from A C, may revolve about the point C ; it becomes immediately inclined to A C ; which inclination increases until the part D coincides with B, or has described half a circle. We hence see

how an angle may be measured by dividing the circle into a great number of parts, and also how necessary that a uniform division should be adopted in all parts of the world, in order to make it extensively useful.

The ancients divided the circumference of the circle into 360 parts, called degrees ; each degree into 60 parts, called minutes ; and each minute into 60 parts, called seconds. And the magnitude of an angle they expressed by the degrees (°), minutes (′), and seconds (″), in that part of the circle between the sides of the angle ; thus an angle of 42 degrees, 23 minutes, 19 seconds, is usually written 42° 23′ 19″.

As the circle is divided into 360 degrees, a half circle will contain 180, and a quarter 90 degrees. A circle contains four right



angles, each embracing a portion of the circle equal to ninety degrees. A right angle, then, is an angle of ninety degrees. The semi-circle above is divided into 180 degrees ; each division contains 10 degrees ; the acute angle embraces 45, and the obtuse angle 135 degrees. Several lines may be drawn from the same point in a straight line, forming many angles ; but the sum of all the angles from the same point, and on the same side of the line, will be equal to two right angles or 180 degrees.

APPLICATIONS.

Many instruments are constructed upon the principles explained above, and are used for a great variety of useful purposes. Most of those used by surveyors for measuring angles in the field, have a circle, or a part of a circle belonging to them, divided into degrees, which render the operations easy and exact. When these angles are to be transferred to paper, a protractor is used ; which is generally found in a case of drawing instruments, and is described in the Young Mechanic, vol. I, p. 131. Sometimes the degrees are marked on the joint of the common rule, which enables mechanics to take the dimensions of angles, and commit them to writing with as much ease as they do those of length and breadth.

By means of graduated circles, we trace the course of heavenly bodies, discover their movements, measure their distances and their size, and predict the moment of an eclipse, or the return of a comet. The needle of the mariner's compass, always directed towards the north, points out to the navigator, on a graduated circle, whether he pursues his proper course, or how much he departs

from it. Geography only represents to us with so much precision the position and relative distances of all the points of the earth, by making use of two graduated circles, one extending round the earth in the directions of east and west; and the other north and south; the degrees of one being longitude, and of the other latitude. It may indeed be said that without the graduation of the circle, which, simple as it appears, was slowly invented, the arts and sciences, and consequently civilization, would be far inferior to their present state. PHILO.

For the Young Mechanic.

ARCHITECTURE—N°. II.

It is the design of this essay to notice, very briefly, the state of the art of building during that period of the world on which *profane* history casts no light. Taking the writings of Moses as containing the earliest history of man, we shall be led to conclude therefore, that architecture very early became an object of primary importance.

According to Moses, the keeping of sheep, and the cultivation of the earth, were the first employments of the human race. It is easy to conceive how the first of these occupations could be profitably pursued, without necessarily requiring the erection of regular and permanent buildings. For, as this sort of life was wholly of a roving character, tents, or buildings as easily moved from place to place, would have been the most proper and convenient. We therefore find, that the patriarchs, who were keepers of flocks and herds, are spoken of as dwelling in tents.

But wherever *agriculture* is carried on to any considerable extent, there permanent and commodious buildings will be almost indispensable. Accordingly we find that agriculture and architecture are coeval. Adam was an agriculturalist; and his son Cain was both an agriculturalist and a builder:—'*He builded a city and called the name of it after his son Enoch.*'

In the time of Cain's immediate descendants, or, according to the Mosaic chronology, in about nine hundred years after the creation, architecture must have attained considerable perfection. The fifth generation from Cain was characterized for its skill in the arts. Articles of brass and iron were manufactured, musical instruments invented, and music systematically taught. And it cannot reasonably be supposed that amidst these improvements and inventions, an art so essential as that of building would have been neglected. On the contrary, we may safely conclude that architecture would have been one of the first objects to which an agricultural and mechanical people would devote their attention.

The building of the Ark in the seventeenth century of the world affords another evidence of the improved state of architecture

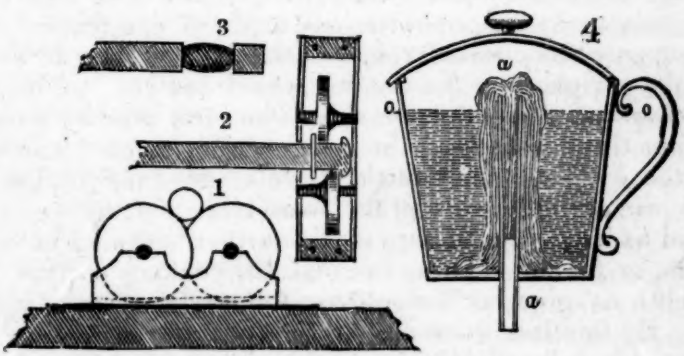
among the antediluvians. For, although Deity himself was the architect of this structure, yet man must have possessed a previous knowledge of the principles of building, in order to enable him to understand the plan, and to carry it into execution.

The building of the city and tower of Babel, on the plain of Shinar, in the eighteenth century of the world, demonstrates that knowledge of the art of brick-making, and the nature of cement existed at that period.

Another proof of the statement, that architecture must have been considerably improved in the time of Moses, is founded on the minute specifications which Jehovah gave to him for the construction of the tabernacle. Those particular directions illustrate the perfection to which the arts in general had attained at that period. And as all arts and sciences generally flourish and decay together, it is fair to conclude that architecture was as much improved as any of those arts which were called into requisition in the building and decoration of the tabernacle. Indeed, that structure was itself a specimen of architecture, to which the other arts were subservient. D. B. H.

For the Young Mechanic.

METHODS OF REDUCING FRICTION.



Friction, or attrition, is produced by the rubbing of the surfaces of bodies in motion; which is increased according to the surfaces in contact, their roughness, and the weight which they sustain. The remedies that have been applied to diminish friction, are almost innumerable; some are complicated, while others are both simple and useful, and to which, we shall chiefly direct our attention.

It is very desirable that all rubbing surfaces should be as smooth and even as possible, which will of itself conduce much to the reduction of friction ; this however applies more particularly

to rolling surfaces, such as the axle of a wheel; as in very flat, broad surfaces, the friction is increased, in consequence of cohesive attraction; and therefore the sliding parts of lathes, printing-presses, &c. should be supported upon narrow and intersected bearings. The most common method of reducing friction, where there is considerable weight, is, by having the rolling axles rest upon wheels or rollers, which have been applied in a variety of forms to accomplish different objects. A contrivance called an anti-attrition axletree, was made by cutting a cavity lengthwise in the under side of the axletree, and introducing a cylindrical roller, which, (the inventor said,) was found by experiment to be an advantage of three to one. Another method was, by having between the axle and nave a hollow space, to be filled up with solid equal rollers, nearly touching one another, with axles inserted into a circular ring at each end, by means of which their relative distances were preserved.

The simplest and probably the best arrangement of wheels for overcoming friction, are those represented in fig. 1, where it will be seen the wheels overlap each other so as to form a place for the axle to rest securely between them without wedging. It is recommended by some, to have the wheels and axle attached in such a way that both may turn together, to obviate the difficulty frequently experienced by the wearing of grooves in the wheels, from the want of oil, or some other cause, by which their action is stopped. The advantage gained by the use of friction wheels is according to the proportion which the primary axle bears to the circumference of the peripheries and axles of the friction wheels. Thus, suppose the circumference of the primary axle to be three, that of the periphery of the friction wheel twelve, and their axles one, the operation will then be as follows : the primary axle turns round four times in turning the friction wheels once, which would reduce the friction to one-fourth, if the axles of the friction wheels and the primary axle were of the same size ; but, as they are only one-third as large, the friction is still further reduced in a three-fold ratio, or to one-twelfth, because the rubbing surface is only one-twelfth as great as it would be if the primary axle turned in boxes. By this it will readily be seen why these are so extensively used in railway carriages. It is, however, not merely on account of the great weight transported by them, but the speed and weight united would otherwise generate so much heat as to produce great injury to the machine.

When wheels are supported by the common cylindrical axle, revolving in boxes or a cavity, the axle and box should never be of the same metal, as they will produce more friction and more wear than when they are of different kinds. Thus a wrought iron shaft will work best in brass or cast iron boxes ; and the same will apply to steel when soft, but if hardened and kept oiled, both shaft and box may be of the same metal. As a general rule, however,

it is best to have them of different metals, whether the shaft works in boxes, or on friction wheels.

We now come to a very important part of our article, viz. the materials for and methods of lubricating machinery. It is doubtless well known that the most perfect polished work is, when examined through a microscope, extremely rough and covered with ridges; and to remedy the imperfection we are obliged to apply oil, or some other substance to fill up the roughness, and thus keep the work in order. It is likewise important that the unguent applied should be according to the finish of the work; for instance, the oil used for a delicate watch should be of the purest and most limpid kind, whereas for a rough cart wheel, tallow, mixed with black lead, has sometimes hardly consistency enough. In mills and other places where considerable wood is used in the machinery, tallow, with a large proportion of black lead, may be applied, as a very good anti-attrition mixture. A species of mineral called Talc, which is of a very unctuous nature, and common in New England, is sometimes used in heavy mill work instead of black lead, and by some it is thought to be equal, if not superior for such purposes. But for my own part, I am inclined to believe black lead incomparable as a dry anti-attrition substance, for it can not only be applied in many cases instead of oil, but will answer well where oil would be entirely useless. In Europe it has been used in the following manner for preventing friction in watch movements; fine black lead was washed a number of times in water until all the gritty particles were separated, when the water was separated from the residuum, which was then mixed with alcohol, to the consistency of common paint, and applied with a camel's hair pencil, to the holes and pivots of the watch, where, after the alcohol had evaporated, a coating of the purest black lead remained, which was examined several years afterwards, and found to be better (if possible) than at first.

I have noticed many instances, where I have thought black lead could be applied with advantage, especially where articles are exposed to considerable heat. It is common in foundries, when a casting is to be removed, as the nut of a large screw, to apply a thin coat of clay, that it may be the more easily removed; but the clay has often so much sand and grit, that it retards instead of assisting. Screws and bolts attached to steam engines, bottle-moulds, &c. subject to heat or rust, could be removed without difficulty, if they had been coated with clean black lead. Although black lead is very useful, yet oil is not the less so, for according to the opinions of Geo. W. Smith Esq. and Mr. J. McIlvaine, given at a monthly meeting of the Franklin Institute, pure sperm oil is the *best* unguent for diminishing friction of railway cars, locomotive engines, and other machinery of similar construction. And Mr. McIlvaine likewise recommends, 'that the oil should be carefully cleansed and deprived of those parts which water could remove.'

We perfectly coincide with the above, as applied to those purposes, and will now proceed to describe the methods of applying it. By referring to fig. 1, you will perceive a dotted line near the bottom of the box containing the friction wheel, intended to represent a quantity of oil, a portion of which is carried on the circumference of the friction wheels, and thus lubricates the axle revolving on them. To prevent the waste of oil by passing along the axle, a collar is attached, as delineated in fig. 2, to act as a check, as the centrifugal force keeps the oil within the box when in motion, and when still it has but little tendency to run up hill. This is the principle upon which the wheels of the Baltimore Railway carriages are oiled, and gives great satisfaction in consequence of its being continual.

Fig. 3 represents the form of a bearing for a shaft running in boxes, which is very favorable for retaining the oil; sometimes the boxes have a spiral groove through them, but it is not generally thought desirable.

A beautiful method of lubricating fixed machinery, was contrived some years ago by Mr. John Barton, a drawing and description of which, I have extracted from the London Mechanics' Magazine. 'It consists of a tin vessel, as delineated in fig. 4, having a tube *aa* passing down through it, and a cover to keep out dust, &c. A number of cotton threads are placed with one end down the tube, the other ends laying over the sides, and descending to the bottom of the vessel. The cup being filled with oil to the line *oo*, and the small tube *a* inserted in the upper box of the tube, the cotton fibres become a syphon acting by capillary attraction, which slowly and gradually conveys the oil down the tube, to the axle to be lubricated. By increasing or diminishing the quantity of cotton, the flow of oil is regulated to suit the consumption of the machine.' J. M. W.

ROLLING HELIX LEVER WATCHES.

An invention has been made by Mr. M'Couall of Leeds and Wakefield, which promises to be of important use in watch and clock making and every kind of machinery. The invention is a new and very superior method of communicating motion from one wheel to another, by what the inventor calls the *rolling helix lever*. The inventor gives the following account of it :—Of this Helix Lever the following are the valuable and distinguished properties. First; it passes over equal spaces in equal times, and consequently is at all times at equal distances from the centre of motion ; a perfection never before accomplished by any practical method of communicating motion. Secondly, it has a continued line of centres, and a single point of contact. Thirdly, its pressure is always in a line parallel to its axis, by which all the friction of

shoulders is avoided. And lastly, it has a rolling action which materially reduces the friction at the point of contact. In communicating motion by means of toothed wheels, it is evident that every tooth must transmit some degree of imperfections on coming into action, and on ceasing to act, and consequently imperfections will be multiplied in proportion to the number of teeth. An examination of a yearly clock on the old principle, and one on that of the new, will immediately evince the immense superiority of the latter in this respect. On the old principle the number of teeth is 1272, and the number of consequent imperfections 148,000,000. On the new principle the number of teeth is 130, and the number of consequent imperfections 179,760. This striking fact clearly establishes the vastly superior accuracy of the new principle as applied to all mechanism designed for the measurement of time. If a machine, constructed upon the old principle, to produce a certain quantity of motion, requires a moving power of 192 ounces or 12 pounds ; one, constructed upon this newly invented principle, will produce the required motion with the wonderful small power of six ounces. This great superiority arises from the peculiar construction of this lever, and its particular mode of action, which places it so decidedly above every other invention yet presented to the public. By means of this, the inventors have been enabled to construct an eight days' clock, with only two wheels and only requiring a weight of six ounces, while one constructed upon the old principle, requires four wheels and three pinions, with a weight not less than twelve pounds to keep it in motion.

PATENTS FOR MASSACHUSETTS.

Granted in June and July, 1832.

From the Journal of the Franklin Institute.

For a *Cooking Apparatus*, called 'Day's economical furnace, oven and boiler ;' Samuel D. and William T. Day, Westfield, Hampden County, Massachusetts, June 8.

A round furnace made of metal, or clay, contains the fuel, and over this furnace, boiling, and other operations, may be performed. There are openings at one side of the furnace, consisting of round holes, or else grate bars, against which is put what the patentees call a tunnel : this is an oven of a particular form, in which roasting, baking, &c. are to be carried on. There is no claim made, nor are the superior advantages of the apparatus manifest to us either from the drawing or description, although each of them has been prepared with much care.

For an improvement in the *Tin Kitchen ;* George Richardson, South Reading, Middlesex County, Massachusetts, June 14.

This, we are informed, is made like the ordinary tin kitchen,

excepting that it is nearly of a square form, with the sides, bottom and back in entire pieces, to exclude the external air ; there, however, is to be a close-fitting lid on the top, or in the back, notwithstanding its entire unity. A shelf, or shelves, may be placed on ledges within, or there may be a spit crossing it in the usual way. The tin case, and also the separate pieces, are to be so formed and placed as to reflect the heat where it is most wanted. In what part the claim to a patent resides, we are not informed.

For an improvement in *Clocks;* Rufus Porter, Billerira, Middlesex County, Massachusetts, June 22.

Some new combinations are made in the escapement, and in the arrangement by which the hour hand is acted upon. There is to be an alarm, the weight of which, in its descent, acts upon a lever, and causing it to strike upon one of the magic matches, the match is inflamed, and this in its turn lights a candle. These are the points claimed.

For a *Rotary Pump*, called the ' Spring or drop valve pump ;' Eli Kendall, Ashby, Middlesex County, Massachusetts, June 22.

This pump is on the same principle with a number of other rotary pumps and steam engines. There is an outer cylinder or drum, with closed ends, and within this an inner cylinder is made to revolve by means of a crank attached to one of its gudgeons, which passes through the centre of one of the heads of the outer cylinder. The chamber of the pump is the space between the inner and outer cylinders. This chamber has a partition, or stop, filling it up at one point ; at one side of this partition is a tube for admitting, and at the other a tube for discharging water. Two metallic valves, filling the capacity of the tube, slide into the inner cylinder as they alternately pass the partition, being forced to do so by the bearing of their outer ends against a strip or plate of metal which acts upon them as a cam.

There is no claim made, and as we have frequent occasion to remark, little or nothing upon which to found one.

For a *Standing Press;* Aaron Hale, Boston, Massachusetts, June 26.

For a *Brand, for branding Barrels, Packages, &c.;* Samuel Huse, Newburyport, Essex County, Massachusetts, June 28.

For an improvement in the *Mode of pointing pegs and pins;* James Hall, North Bridgewater, Plymouth County, Massachusetts, July 7.

The points upon pegs, or pins, are to be formed upon the face of the block, before the pegs or pins are split out. To effect this, a shaft carrying the necessary cutters, is made to revolve horizontally. These cutters may be formed of plates of steel, like circular saws, but having their edges bevelled in such manner as shall

give to the point of the peg the form which may be required. A number of cutters of this description may be passed on to the shaft and held there by a screwed nut. Instead of so forming the cutters, grooves may be made around a steel cylinder, and the teeth be formed by filing across them. The patent is not taken for any precise mode of making the cutting tool, but for the modes of construction whereby a circular motion is given to the teeth when in operation, and thus forming the points, as set forth in the specification.

For a *Socket Spade;* Charles Richmond and Samuel Caswell, Jr. Taunton, Bristol County, Massachusetts, July 13.

For a *Double Coffee Mill;* Thomas W. Witherby and Joseph Torry, Millbury, Worcester County, Massachusetts, July 17.

The difference between this mill and the cast iron vertical coffee mill used by most persons, consists in its being furnished with two revolving toothed nuts, covered by two corresponding shells. One handle serves to turn both ; and one regulating screw to set them. The hopper has a moveable partition in it, allowing two different articles to be ground, without their interfering with each other ; or, of course, both may be used for the same article.

For a *Cotton Spreading and Picking Machine;* John C. Whitin, Northbridge, Worcester County, Massachusetts, July 20.

This spreading and picking machine is constructed like some others now in use, but the wire cylinders are to have a flanch, or heading on each end, projecting about two inches, so as to retain the sheet or lap of cotton, with a smooth, compact edge. All the moving cylinders, rollers, &c. excepting the beaters, are to be geared, and these are to be run as usual by straps. The claim is to ' the application of gearing to the several movements, instead of belts, and of the flanch or rim to the ends of the several wire cylinders.'

For a *Machine for Grinding Cylinders which require to be perfectly straight and true*, called a ' Traverse Grinder ;' Jonathan Bridges, Troy, Bristol County, Massachusetts, July 24.

Steel and other cylinders, are frequently ground perfectly true by fixing a stone, or other grinder, upon a shaft parallel to that of the cylinder, and causing it to traverse from end to end of the cylinder ; a rotary motion, generally in opposite directions, being given to each. The shaft of the grinder is, in this case, made cylindrical, that it may slide within collars at either end of the machine. The shaft of the grinder must, necessarily, be at least double the length of the cylinder to be ground. The present invention is for an application of the same mode of grinding, but by machinery which is differently arranged. The shaft upon which the stone or other grinder is placed, does not traverse backward and forward, but the grinder itself slides from end to end of the

shaft. The latter is made cylindrical, and is grooved from end to end, and a piece projecting from the hole in the grinder into the groove, prevents it from turning round upon it, and guides it as it traverses along. There are pulleys placed upon the shaft of the cylinder to be ground, bands from which give motion to the grinder shaft. The apparatus which gives the traversing motion to the grinder, would require an engraving for its perfect explanation. The claim is to the particular arrangement of the machinery by which this is effected.

It is contemplated to apply this instrument to the grinding of cylinders of all kinds, whether of wood or metal, and particularly to piston shafts and card cylinders. In grinding cards it is observed that it may be fixed in the place of the doffer cylinder, and moved by means of a bolt from a pulley on the main card cylinder shaft, its construction admitting of its being carried to the body to be ground.

For machinery for finishing the ends of *Bobbins or Spools;* Simeon Presbury, Jr. Canton, Norfolk County, Massachusetts, July 26.

This patent is taken for an apparatus used in finishing off the ends of the bobbins or spools used in spinning machines, so as to render them perfectly true and uniform, and to correct them should they become untrue by warping or otherwise. The patentee states that the inconvenience frequently experienced from the irregular draft of the spools, results in general from a want of truth in the ends of the bobbins, a defect which this contrivance is calculated to remedy. The apparatus consists of a mandril or pin, of the size of the spindle upon which the bobbin is intended to run. Upon this he fixes cutters, usually three, which stand at right angles to the pin ; or they may vary from a right angle when required. An enlargement or hub is made upon the pin for the purpose of attaching the cutters, or they may form one piece with the hub, which may slide on to the pin, and be secured there, whilst it is capable of being removed to sharpen the cutters. The claim is 'to the application of the aforesaid revolving cutters, or other modifications thereof, to the making or repairing of all kinds of bobbins or spools used in spinning.'

THE BURNING SPRINGS.

FLORIDA CO. (KY.) APRIL 27, 1832.

Dear Sir,—In the prosecution of my Sunday School Agency, I yesterday reached this place, in the immediate vicinity of which is the Burning Spring, and truly it is a curiosity. On approaching it I heard it boiling with a noise equal to that of a fifty gallon kettle over a hot fire. It is situated near the shore of a hot creek, which winds its way through a deep valley between the mountains

near the road side. There is a hole in the ground, about two or three feet deep, and about the same in diameter, which, after the rain, is filled to the top with water that is kept perpetually and briskly boiling by the gas which issues from a narrow space between two rocks at the bottom. This water is always kept muddy, but never runs over except by an unusual quantity of rain.

After viewing it for a few minutes, a lighted taper was applied to the ascending gas, and instantly the whole surface was covered with a blush red flame three feet high, emitting a smell similar to that of burning alcohol, and with an intense heat. Thus it continued to burn for an hour, while I remained, and I left it on fire.

The blaze, on a dark night, I am informed, illumines the whole valley and circumjacent hills, and never goes out but by the effort of a man, or the descending shower.

If nothing interferes to extinguish the flame, it continues to burn, the water becomes heated and evaporates, when the issuing gas, burning with more intense heat, consumes whatever combustible substance may be thrown into the water ; and even the collected mud at the side of the hole is pulverized with heat as at the mouth of the surface.

Were this gas suitably confined and directed, I have no doubt it might be used for some valuable purpose, either to drive a steam-engine, or illuminate a city ; but no use is made of it, nor does the owner of the land seem to regard it with interest, or as a curiosity.

Whence this gas, or whatever produces it, I leave to the conjectures and experiments of the learned, being confident it is the most singular phenomenon I have ever seen.—*S. S. Jour.*

COLOR OF THE AIR.

We are informed by the Cabinet Cyclopedia, that the same principle of vision which makes the sea colorless and transparent when surveyed in small quantities, but deep green when looked upon in the mighty deep itself—is applicable to the air. The air which fills an apartment, and immediately surrounds us when abroad, appears colorless and perfectly transparent. But when we behold the immense mass of atmosphere through which we view the firmament, the color is reflected with sufficient force to produce distinct perception. But it is not necessary for this that so great an extent of air should be exhibited to us as that which forms the whole depth and thickness of the atmosphere. Distant mountains appear blue, not because that is their color, but because it is the color of the medium through which they are seen. Thus, Campbell, philosophically as well as poetically, remarks that

> ——'distance lends enchantment to the view,
> And robes the mountain in its azure hue.'

BOSTON MECHANIC'S LYCEUM.

THIS Society has just completed its third course of exercises, consisting of lectures, debates, declamation, and extemporaneous speaking. These exercises have been conducted by the members alone, and the result plainly shows, that mechanics and others can conduct societies of this kind on purely mutual principles, exchanging knowledge for knowledge, and amusement for amusement, to the pleasure and profit of all concerned.

The Managers for the ensuing year are, Timothy Claxton, President; Dunbar B. Harris, Secretary; Joseph M. Wightman, Treasurer; William Grant and George P. Oakes, Curators.

There is also a committee to solicit candidates for membership, viz: George B. Proctor, John P. Farmer, Francis B. Winter, William S. Baxter, and Charles T. Young.

The annual assessment is one dollar, payable at the commencement of the season.

QUESTIONS.

MESSRS. EDITORS,—If any of your correspondents will answer the following questions, they will oblige A SUBSCRIBER.

What occasions the singing (as it is called) of a tea-kettle before boiling?

What produces the rumbling noise we hear when hot iron is plunged into water, or steam let into a cold vessel?

Why does a razor shave better when hot?